

**WHAT IS CLAIMED IS:**

1.       An improved ventilating range hood, comprising:
  - a sheet metal collecting hood, vented to the outdoors;
  - a variable speed, electronically controllable fan, mounted in such a way as to draw air from a cooking area and out through said vent of said collecting hood;
  - a plurality of air quality sensors capable of detecting both comfort factors and the presence of hazardous substances in the air.
  - a controller that is programmed with an algorithm that responds to the presence of air quality factors by adjusting the speed of said variable speed fan according to a computed ventilation requirement.
2.       The improved range hood of claim 1, wherein said air quality sensors include sensors for temperature, humidity, carbon monoxide and smoke.
3.       The improved range hood of claim 2, including an audible alarm that is activated if the detected level of hazardous substances remains at a pre-established threshold.
4.       The improved range hood of claim 3, including a mounted display panel that indicates the status of each hazardous substance.
5.       The improved range hood of claim 4, wherein said controller uses a fuzzy logic control algorithm that provides the appropriate fan motor speed based on a computed ventilation requirement.
6.       The improved range hood of claim 5, wherein said variable speed fan motor is controlled by a pulse-width modulated input.

7. The improved range hood of claim 5, where said controller stores multiple readings in memory, so as to determine if there is an upward or downward trend in the measured signal.

8. The improved range hood of claim 7, wherein said air quality sensors are used to detect the presence of a fire, and if a fire is detected, said variable speed fan is turned OFF and an audible alarm is turned ON.

9. A smart range hood, comprising:  
a vent connected to said range hood and vented to the outdoors;  
a variable speed fan connected to said vent;  
a plurality of air quality sensors; and  
a micro-controller, said micro-controller being adapted to process signals from said plurality of air quality sensors and determine the appropriate speed of said variable speed fan based on levels of predetermined air quality constituents detected by said air quality sensors.

10. The range hood of claim 9, wherein said plurality of air quality sensors include, temperature, humidity, carbon monoxide and smoke sensors.

11. The range hood of claim 10, wherein said micro-controller utilizes an algorithm that combines the output of said plurality of air quality sensors in order to derive an output ventilation requirement.

12. The range hood of claim 10, including an override control which allows a user to turn said variable speed fan ON to a desired level manually and to shut said variable speed fan OFF.

13. The range hood of claim 12, wherein said air quality sensors are mounted to sample both the air stream drawn into said range hood through forced convection, as well as, the ambient air in the surrounding living space.

14. A system that senses the air in and around a range hood for the presence of particular hazardous elements, comprising:

a collecting hood;

a variable speed fan;

a series of sensors adapted to sense predetermined hazardous elements;

a controller adapted to integrate signals from said series of sensors, derive a ventilating requirement from them, and with said ventilating requirement drive said variable speed fan in accordance with said ventilating requirement.

15. The system of claim 14, including a display adapted to indicate the presence of each of said particular hazardous elements.

16. The system of claim 15, wherein said display includes an audible alarm that is activated if hazardous elements are detected.

17. The system of claim 14, wherein said controller uses a fuzzy logic control algorithm to provide appropriate fan speed based on computed ventilation requirements.

18. The system of claim 14, wherein said variable speed fan is mounted exterior to the structure being ventilated.